Study of Solid Waste Management for Nashik City

Swati A. Patil, Leena N. Patil, Vaishali V. Ahire, Mosin A. Khatik, Rahul V. Thorat

Abstract- Rising population, technological advancement, economical , industrial revolution and changing life style has lead to various types of environmental problems. In this context sold waste is one of the major problame. It causes different type of pollution,spreaiding of various disease and due to dumping of solid waste soil also loose it's fertility .Solid wastes are those organic and inorganic waste materials produced by various activities of the society. Improper solid waste management affects on public health, causes environmental pollution, accelerates natural resources degradation, climate change and greatly impacts the quality of life of human beings. The purpose of this study is to describe the application and progress of the Reduce-Reuse-Recycle initiative and its gradual implementation and development in solid waste management in Nashik(MH) India through the study of the municipal solid waste management (MSWM) systems.

Keywords- Sources, Clasiification, Collection, Processing of waste ,Disposal

I. INTRODUCTION

India is the second largest nation in the world, with a population of 1.31 billion, but it does not have enough resources or adequate systems , to treat its solid wastes. Now a days India is facing a large problem of its increasing urban population and available resources . [1]Urban society rejects and generates solid material regularly due to rapid increase in production and consumption.[2]The problem is more acute in developing nations than in developed nations, as their economic growth as well as urbanisation is more rapid.GIZ-ASEM in partnership with the Ministry of Environment and Forests, Government of India, is supporting the Ministry of Urban Development, Government of India and the Ministry of Housing & Urban Poverty Alleviation, Government of India in strengthening the environmental components under the Jawaharlal Nehru Renewal Mission (JNNURM) in this case in the sector of Solid Waste Management. Within the scope of the technical cooperation, 7 cities are included, namely, Cochin, Raipur, Shimla, Nashik, Varanasi,Tirupati and Nainital.[3].The present work is done for solid waste management of Nashik city.Nashik is an important part of “Mumbai-Pune-Nashik Gold Triangle” development plan. For the business purpose the city has to gear up for growth, expansion, socio-economical and business developments inNashik, which has been referred to as the "Wine Capital of India", is located in the Western Ghats, on the western edge of the Deccan peninsula on the banks of the River Godavari..

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Nashik is the third most industrialized city in Maharashtra after Mumbai and Pune.[4]Keeping the above facts in view overall integrated solid waste management facility was created. The solid waste generated is greater than 3 lakh Metic tonnes per year which is a very huge quqntity of solid wate generation.

II. SOLID WASTE MANAGEMENT IN NASIK

Nasik city was generating about 300 metric tonnes of solid waste per day in year 2006 which has raise to 441 metric tonnes in year 2013. All the solid waste brought from every ward in Nasik is brought at Municipal Solid Waste facility at Pathardi where it is processed there after sorting it. The plant has pre-sorting unit, aerobic compositing unit, leachate treatment plant, Refuse Derives Fuel Plants, Animal Carcass Incinerator and sanitary landfill etc. To combat this huge amount of solid waste generated, Nasik Municipal Corporation has adopted best way of managing solid waste. Nasik Municipal Corporation has abolished waste bins system and has an introduced door to door collection of waste through “Ghantagadis vehicles with the bells from 1996. Total of Ghantagadis more than 120 are on contract which receives waste from householders which is sorted out the recyclable material from it. It is disposed through recycling chain. Nasik Municipal Corporation has established a plant for converting garbage into valuable compost or manure.The collected solid waste is transported to compost plant where it is mechanically segregated and processed to produce fine quality of compost. 40% non biodegradable material which can not be converted into compost is transported to sanitary landfills sight. The cost of production of 1 metric tonn compost manure is Rs 1700 which is sold in the market at the rate of 2000 metric tonnes which gives net profit of Rs 300 per metric tonnes. This project of Municipal Solid Waste Management has made city free from waste bins system.[4]

1.1 Chief sources of solid waste generated in Municipal areas-

a) Household Waste.
b)Commercials.
c)Street sweeping.
d)Hotels and Restaurants.
e)Clinics and dispensaries.
f)Construction and Demolition.
g)Sludges and Scales.[5]

1.2 Classification of solid Waste-

a) Bioderadable wastes-Garbage (putrecible waste), Food,vegetables, meat.
b) Non Bioderadable wastes- Rubbish (nonputrecible waste) either combustible or noncombustible. Rubber, wood, paper & Glass, metals,ceramic.
c) Bio medical wastes-Pathological wastes- Cotton,Syringe & plastic bottles.
d)Industrial waste- Eg. Paints, sand,metals, different

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chemicals.

e) Agricultural waste- farm animal manure & crop residue[6].

III. COLLECTION OF SOLID WASTE IN NASHIK(MH) INDIA CITY-

NMC has given contract of collection and transportation of solid waste of the 6 divisions of the city to two contractors. Contract of collection and transportation includes door to door collection of solid waste through Ghanta Gadi and transportation to Municipal Solid Waste Treatment Facility. Solid waste is collected from 2.9 lakh households of 108 wards of the city through 124 Ghanta Gadi's and ownership of the Ghanta Gadi's is with NMC.

Table 1: No. of establishments covered by door to door service[7]

Sr. No.	Establishment type	Total No.
1	Households	2,97,890
2	Hotels and Restaurants	1806
3	Commercial Establishment	300

IV. PROCESSING UNITS OF WASTE IN NASIK CITY (MH) INDIA

3.1)Pre-sorting Unit:-It is electromechanical segregation system for incoming non segregated MSW with the capacity of 500 TPD and it comprises of two lines with all necessary requirements and materials. After mechanical segregation compostable material will go to windrow composting, material with calorific value goes to RDF plant and inert will be further processed at Inert Processing plant[8]

3.2) Aerobic Composting Unit:-Composting is done through windrow composting method and sheds have been constructed for windrows. Today out of total MSW 3 to 5 % is converted into compost. The compost has already become popular amongst the farmers within 100 km radius of Nashik. By maintaining the price line of Rs2000/MT Ex-factory level for loose form and Rs. 2450/- for packed form with necessary backup support, entire quantity of compost will be saleable in this belt. Once segregation at source will be practiced then the quantity of generation of compost will increase up to 10 to 15 % of total MSW.[8]

3.3) Inert processing unit:-Inert processing unit, with capacity of 50 TPD, comprises of mechanical sieve and airdensity separator. Main purpose of inert processing plant is to recover the construction material from the waste and to recycle it by selling or utilizing it for in house construction activities. This is mainly to minimize landfill burden on O&M cost and also saving of land.[8]

3.4) Leachate treatment plant:-Leachate treatment plant with capacity of 0.4mld leachate or 10 TPD organic wasteshas been installed for treatment of leachate coming out from the windrows, the solid waste dumps and sanitary landfill site. Proper arrangement for collection and transportation of leachate has been made. As leachate is primarily generated in monsoon season and during other period, same plant is utilized for bio gas generation from organic waste. 40 KW power is generated through the plant and utilized for operation of pumps at MSWM facility.[8]

3.5) Refuse Derived Fuel (RDF) Plant:-The high calorific energy containing materials present in MSW are to be handled separately from the stage of receiving at the tipping floor onwards. RDF plant with capacity of 150 TPD is installed for generation of fuel pellets from high calorific value materials. Woody materials, paper products, textiles, jute etc forms the main constituents of RDF which is a valuable source of alternate energy. The technology for RDF primarily focuses on refinement of MSW through material re-combinations, segregation, drying, size reduction, blending and homogenization. This material is further

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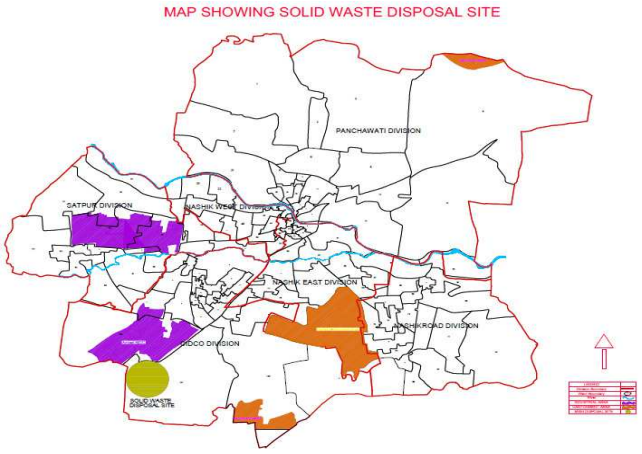
refined for separation of sand, dust, metals, glass etc before grinding or shredding. The shredded material is obtained as fluff (<2 cm size) which is further processed into pellets, briquettes or bailing. NMC is exploring the possibilities for marketing of fuel pellets and nearby industries have shown their interest for fuel pellets.[8]

3.6)Animal Carcass Incinerator:-Dead animal carcass incinerator with the capacity of 250Kg per hour is installed forthe incineration of dead animals such as dogs, cattle's etc.[8]



V. DISPOSAL METHODS & SITE IN NASIK [MH] INDIA

Methods of Dispose of Solid Waste- In Nasik Municipal Corporation, whatever the solid waste is collected, it is sorted in two major types-First one the waste which is not useful for any good purpose i.e. rejects non-recyclable materials, it collects in the landfill. It is known as "Non-Biodegradable solid waste". Second one is the waste which is utilize for any good purpose, it is sorted out separately i.e. it is use to make manure. This method is known as "Decomposition of solid waste" or "Biodegradation".

4.1.Sanitary Landfill:

The solid waste that is not suitable for any processing is transported to the sanitary landfill site. For this purpose, a sanitary landfill in an area of 2 hector has been developed. All the necessary aspects of scientific land filling were considered during creation of sanitary landfill. Proper arrangement for leachate is also provided and this is connected to the leachate treatment plant for further processing.[7]

4.2. reduce/recycle/reuse/ of MSW Waste Streams in Nashik:

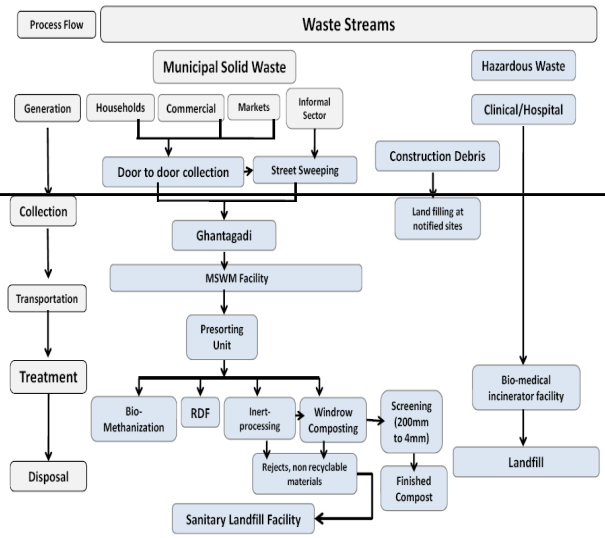
a. Glass, paper, metal: A substantial amount is collected by Ghantagadi workers and informal rag pickers and this is further handed over to scrap merchants in the city.

b. Organic Waste: Organic waste is segregated at the processing facility through the mechanical segregation process and it is then converted to compost through aerobic composting. Most of the organic waste is converted in compost and sold to farmers. Waste from permanent and temporary vegetable markets is collected and transported to the composting plant and reused as organic manure.

c. Construction Debris: NMC has identified sites for dumping the construction debris. This waste stream is currently not entering the MSW stream. The responsibility for disposing the construction debris is with the waste generators and not with the Corporation.

d. Street Sweeping/ Drain Cleaning: This material is collected by the safai karamcharis and transported to the Ghanta Gadis in the respective wards.[7]

Process Flow of Current Municipal Solid Waste Streams in Nashik[7]



VI. FUTURE SCOPE

Source segregation of waste is a statutory requirement as per the MSW (M&H) Rules, 2000. As mixed wet and dry waste loses value and makes it very difficult to handle the waste or tosegregate it further.There is a thus need to segregate waste at source into wet and dry fractions. Wet can be defined as vegetable peels, food waste, garden waste, etc. Dry can be defined as metal, paper,wood, cloth, etc. Segregated waste is easier to handle by the waste collectors. Treatment of segregated waste is less energy intensive, reduces the burden to the environment, improves quality of compost and increases the production of compost and recyclables.There is a further need to segregate and keep separately Hazardous and Hospital waste as per the MSW (M&H) Rules 2000, Hazardous Waste Management Rules 2008, and BiomedicalWaste (M& H) Rules 1998.[9] In future there is scope for improvement in selection of proper system of collection & disposals, Number of vechicles should be increased and euipments required for the processing plant is also increased for smooth funtioning of processing plant.

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